

NOTES ON THE LIFE HISTORY AND ECOLOGY OF THE DRAGONFLIES (ODONATA) OF CENTRAL CALIFORNIA AND NEVADA.

By CLARENCE HAMILTON KENNEDY,
Of Cornell University, Ithaca, New York.

INTRODUCTION.

This is the second of three general papers on Pacific Coast Odonata. The first concerned Washington and Oregon Odonata.¹ The third, which is now in preparation, will be based on collecting done in southern California during the summer of 1915.

The object of this series is, first, to give a view of Pacific coast dragonflies and their varied and interesting environments, and, second, to bring the data together on which a list of western Odonata can be written. This list is now in preparation and, covering that area of Canada and the United States west of the one hundredth meridian, already includes nearly 200 species.

In the present paper, as in the first, I have made descriptions and illustrations as complete as possible because much of the literature on western dragonflies is inaccessible to even the average college student.

The trip to Nevada was made possible by a liberal advance of money from Mr. E. B. Williamson, who later received his pay in a series of the specimens collected. At all times in the work I have received his constant encouragement and help. The greater part of the work on the paper was done in the Stanford University laboratories under Prof. Vernon L. Kellogg, whose kindly appreciation and critical help have been among the pleasures of the undertaking. The paper was completed in the Cornell University laboratories, where Dr. J. G. Needham very kindly assisted me on the gomphines.

A series of specimens covering all the forms discussed in the following pages, except such as are specifically stated to be elsewhere, has been deposited in the United States National Museum.

1. A PACIFIC COAST VARIETY OF *AGRION AEQUABILE*.

Since my arrival at Cornell I have received a shipment of interesting California Odonata from Mr. and Mrs. L. R. Reynolds, of San Francisco. These were interesting in that several species were taken at altitudes of 8,000 to 10,200 feet in the Sierras. These are listed in the final section of this paper.

¹ Kennedy, C. H. Notes on The Life History and Ecology of The Dragonflies (Odonata) of Washington and Oregon. Proc. U. S. Nat. Mus., vol. 49, pp. 259-345, July 28, 1915.

Among these were a male and female *Agrion aequabile* (Say), the first recorded from California, which were larger than var. *yakima* and had slightly more color in the wings. These are apparently an undescribed race. This is the third variety of *aequabile* found in the West, var. *yakima* being found in the Columbia River basin, var. *coloradicum*¹ described from Boulder County, Colorado, and this form now found in California.²

Mr. and Mrs. Reynolds have very kindly deposited these specimens in the United States National Museum.

AGRION AEQUABILE CALIFORNICUM, new variety.

Type.—Cat. No. 20814, U.S.N.M. A male from the collection of L. R. and C. D. Reynolds, taken at Blue Lake, Humboldt County, California, May 6, 1911, by F. W. Nunenmacher.

Allotype.—Cat. No. 20814, U.S.N.M. A female from the collection of L. R. and C. D. Reynolds, taken at Blue Lake, Humboldt County, California, May 6, 1911, by F. W. Nunenmacher.

Male, color.—Thorax and abdomen metallic blue, except the second lateral suture, the metepisternal keel and the dorsal edge of the metinfraepisternum, which are creamy. Coxae and legs black. Pterostigmas absent. Wings (fig. 1) flavescent with the apices dark. The specimen is teneral so that the wings are not as dark as in the figure. The front wings are dark on the apical three-fourths of the distance from nodus to apex. The hind wings are dark on the apical four-fifths of the distance along the costa from the nodus to the apex. In the front wings the basal edge of the dark area is vertical to the costa. In the hind wings it slants from the costal edge toward the base of the wing, reaching the anal margin opposite the nodus.

Female, color.—Similar to that of the male but general body color metallic green. Labrum creamy with a black center. Abdominal segments 8–10 with a middorsal pale stripe and their sides largely pale. Wings (fig. 2) with white stigmas. Front wings with the dark area covering the apical three-fifths of the distance from nodus to apex. In the hind wings the dark covers, along the costa, the apical three-fourths of this distance. The basal edge of the color is perpendicular to the costa in the front wings and diagonal in the hind wings.

Male, abdomen (including appendages), 40 mm.; appendages, 15; hind wing, 32. Female, abdomen, 39; hind wing, 35.

2. NOTES ON LESTES STULTUS AND ITS NYMPH.

This black *Lestes* was described in 1861 by Hagen³ from a single mutilated male in the Museum of Comparative Zoology. Since that

¹ Cockerell, T. D. A., *Psyche*, vol. 20, 1913, p. 173.

² Since writing this I have found in the Cornell collection a male *Agrion aequabile yakima* taken at Corvallis, Oregon, June 29, 1896. This is west of the crest of the Cascade Mountains. In the collection of the U. S. Biological Survey in Washington, D. C., are a male and a female of *Agrion aequabile* collected on the Owyhee River, Rome, Malheur County, Oregon, June 20, 1915, which are intermediate between variety *yakima* and variety *californicum*. Other specimens of *californicum* from Seattle, Washington, are in the collection of Dr. Philip P. Calvert.

³ *Syn. Neur. N. Amer.*, 1861, p. 67.